

CO2 Breathing Ramjet Propulsion for Planetary Exploration Applications

Completed Technology Project (2017 - 2018)



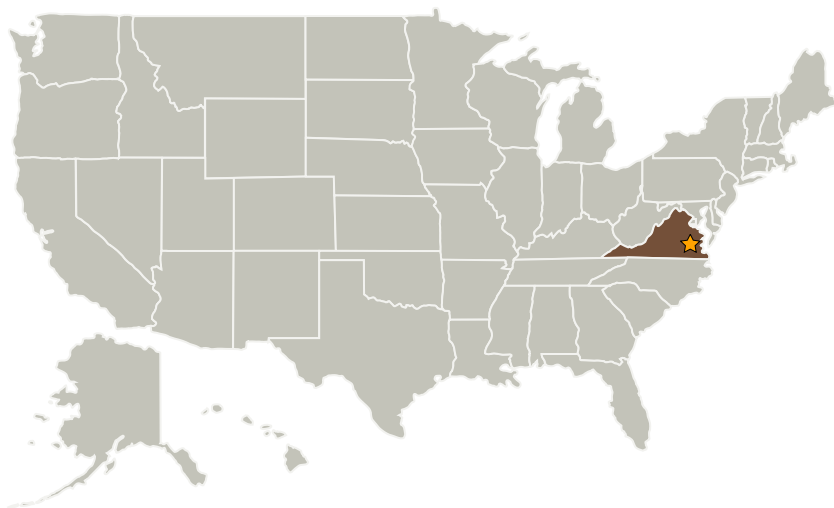
Project Introduction

Goal: Assess the feasibility of a solid fueled preburner and/or combustor for a ramjet in a carbon dioxide atmosphere using physics-based modeling and simulation. **Gap:** Atmospheric exploration of planets with carbon dioxide atmospheres (e.g. Venus, Mars) is not currently possible with fuel efficient, conventional air breathing engines (e.g. turbojets) due to the incompatibility of metallic fuels with turbomachinery. **Solid-fueled ramjets** are a potential solution because they have been developed for terrestrial applications and have no moving parts. **A solid fueled ramjet** would provide a storable propellant option for planetary atmospheric exploration at high speeds.

Anticipated Benefits

This technology would benefit exploration at Mars and Venus

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Langley Research Center (LaRC)	Lead Organization	NASA Center	Hampton, Virginia



CO2 Breathing Ramjet
Propulsion for Planetary
Exploration Applications

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Primary U.S. Work Locations

Virginia

Project Website:

https://www.nasa.gov/directorates/spacetech/innovation_fund/index.html#.VC

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Center Innovation Fund: LaRC CIF

Project Management

Program Director:

Michael R Lapointe

Program Manager:

Julie A Williams-byrd

Principal Investigator:

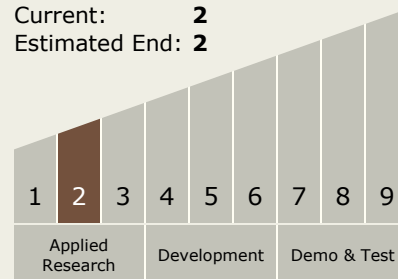
Erik L Axdahl

Technology Maturity (TRL)

Start: 2

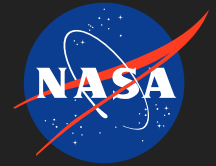
Current: 2

Estimated End: 2



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Technology Areas

Primary:

- TX07 Exploration Destination Systems
 - └ TX07.1 In-Situ Resource Utilization
 - └ TX07.1.3 Resource Processing for Production of Mission Consumables

Target Destinations

Mars, Others Inside the Solar System